IN THE U.S. PATENT AND TRADEMARK OFFICE

Appellants:	James T. LaGrotta et al.
Application No.:	09/919,020
Art Unit:	2614
Filed:	July 31, 2001
Examiner:	Karen L. Le
For:	USE OF OVER-THE-AIR OPTICAL LINK WITHIN A GEOGRAPHICALLY DISTRIBUTED BASE STATION
Attorney Docket No.:	129250-002151/US

APPLICANT'S BRIEF ON APPEAL (Corrected)

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APPELLANT'S BRIEF ON APPEAL

I. REAL PARTY IN INTEREST:

The real party in interest in this appeal is Lucent Technologies Inc. Assignment of the application was submitted to the U.S. Patent and Trademark Office on July 31, 2001, and recorded on the same date at Reel 012334, Frame 0150.

II. RELATED APPEALS AND INTERFERENCES:

There are no known appeals or interferences that will affect, be directly affected by, or have a bearing on the Board's decision in this Appeal.

III. STATUS OF CLAIMS:

Claims 1-7, 10-13, 16-19, 22-25 and 28-30 are pending in the application, with claims 1, 10, 17, 24 and 29 being written in independent form.

Claims 1-7, 10-13, 16-19, 22-25 and 28-30 remain finally rejected under 35 U.S.C. §103(a). **Claims 8, 9, 14, 15, 20, 21, 26 and 27 have been canceled.** Claims 1-7, 10-13, 16-19, 22-25 and 28-30 are being appealed.

IV. STATUS OF AMENDMENTS:

A Request for Reconsideration ("Request") was filed on October 7, 2005. In an Advisory Action dated November 16, 2005, the Examiner stated that the Request was considered; however, the Request did not place the application in condition for allowance.

V. SUMMARY OF CLAIMED SUBJECT MATTER:

(i). Overview of the Subject Matter of the Independent Claims

The present invention provides for methods and apparatuses for connecting sections of an RF base station. Overall, the present invention allows an RF base station to service a location where real estate is expensive at a much lower cost without reducing the capacity or the signal quality of the system.

In accordance with the present invention, communications between two sections of an RF base station of a wireless communication system is implemented using an over-the-air optical link. In particular, the present invention provides an RF base station comprising: 1) an RF section, which may include an RF antenna, and 2) a non-co-located processing and/or control section, where (1) and (2) are coupled using wireless optical communication equipment.

Although wireless optical communication equipment has been used for so-called last mile transmission in wireless communication systems, it remained for the applicants to realize that it is advantageous to couple the two disparate technologies in the specific context of a geographically distributed base station. Significant in this regard is the fact that additional equipment would be needed to process the RF signal into optical signal and visa versa, therefore, increasing the cost of coupling two such types of equipment. It remained for the applicants to realize that the disadvantages of the additional equipment to process the signal so that it can be used with the optical and the RF equipment are outweighed in this particular context by the virtue of reduction in cost realized by not having to lay cable to connect non-co-located sections of an RF base station. Moreover, each of these types of communication equipment is capable of operating independently to communicate information

between two endpoints. Thus, without the motivation provided by the applicant, there is no incentive to combine these two types of equipment, since each can be used without the other for communication between two endpoints.

More specifically, independent claim 1 reads as follows (exemplary specification citations given in parenthesis):

1. **An RF base station apparatus, comprising:**
first wireless RF communication equipment (page 4, l. 27 to page 5, l.11 and Figure 1 elements 105, 110 and 320) **; and**
wireless optical communication equipment coupled to the first wireless RF communication equipment (page 6, ll. 11-16 and Figure 1, elements 210, 230, 240 and 250)**,**
the wireless optical communication equipment being adapted to communicate signals between the first wireless RF communication equipment and processing and control equipment (page 9, l. 6 to page 11, l. 29) **, and**
the first wireless RF communication equipment and the processing and control equipment being non-co-located (page 5, ll. 5-7, page 9, ll. 11-26 and Figure 1)**.**

Independent claim 10 reads as follows (exemplary specification citations given in parenthesis):

10. **An RF base station, comprising:**
an RF antenna;
first wireless optical communication equipment coupled to an RF communication equipment (page 4, l. 27 to page 5, l.11 and Figure 1 elements 105, 110 and 320)**;**
a processing and control section, the processing and control section being at a significant distance from the RF antenna (page 5, ll. 5-7, page 9, l. 6 to page 11, l. 29, and Figure 1)**;**
second wireless optical communication equipment coupled to the processing and control section; and
the first wireless optical communication equipment being adapted to communicate with the second wireless optical communication equipment (page 6, ll. 11 to 15, page 10, l. 5 to page 11, line 21 and Figures 2 and 3) **.**

Independent claim 17 reads as follows (exemplary specification citations given in parenthesis):

17. A method, comprising the steps of:
receiving an RF signal at an RF antenna of an RF base station (page 10, l. 5 to page 11, l. 29)**;**
modulating a signal representing the RF signal onto an optical signal (page 10, l. 5 to page 11, l. 29)**; and**
transmitting the optical signal by wireless optical communication equipment to a processing and control section of the RF base station, the processing and control section being at a significant distance from the RF antenna (page 9, ll. 10-26)**.**

Independent claim 24 reads as follows (exemplary specification citations given in parenthesis):

24. A method, comprising the steps of:
obtaining a signal at a processing and control section of equipment of an RF base station, the processing and control section of equipment being at a significant distance from an RF antenna (page 10, l. 5 to page 11, l. 29 and page 9, ll. 10-26)**;**
modulating a signal representing the signal onto an optical signal (page 10, l. 5 to page 11, l. 29)**; and**
transmitting the optical signal over wireless optical communication equipment to the RF antenna of the RF base station (page 10, l. 5 to page 11, l. 29)**.**

Independent claim 29 reads as follows (exemplary specification citations given in parenthesis):

29. An RF base station, comprising:
an RF antenna (page 6, ll. 27 and 28)**; and**
a telescope coupled to the RF antenna, the telescope being adapted to communicate signals between the RF antenna and processing and control equipment of the RF base station (page 6, l. 27 to page 7, l.6)**, the RF antenna being at a significant distance from the processing and control equipment of the RF base station** (page 9, ll. 10-26)**, and wherein signals received by the RF antenna conform to a predefined wireless communication standard** (page 10, ll. 5 to 21)**, and the signals communicated by the telescope represent information that conforms to the predefined wireless communication standard** (page 10, ll. 5 to 21)**.**

(ii). The Remainder of the Specification Also Supports the Claims

The Appellants note that there may be additional disclosure in the Specification that also supports the independent and dependent claims. Further, by including the specification citations in parenthesis above the Appellants do not represent that this is the only evidence that supports the independent claims nor do Appellants necessarily represent that these citations alone can be used to fully interpret the claims of the present invention. Instead, the citations provide background support as an overview of the claimed subject matter.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL:

Appellants seek the Board's review and reversal of the rejection of claims 1-7, 10-13, 16-19, 22-25 and 28-30 under 35 U.S.C. §103(a) based on alleged admitted prior art (Fig.1) in combination with U.S. Patent Application No. 2002/0149811 to Willebrand ("Willebrand").

VII. ARGUMENTS:

A.) The Section 103 Rejections

Claims 1-7, 10-13, 16-19, 22-25 and 28-30 stand rejected under 35 U.S.C. §103(a) as being unpatentable over alleged admitted prior art (Fig.1) in view of Willebrand. Appellants respectfully disagree.

Claims 1-16 of the present invention require an RF base station that comprises: (a) first wireless RF communication equipment; (b) wireless optical communication equipment coupled to the first wireless RF communication equipment, and adapted to communicate signals, between the first wireless RF communication equipment and processing/control equipment; wherein (c) the

first wireless RF communication equipment and the processing and control equipment are not co-located.

The Examiner acknowledges that the alleged admitted prior art does not disclose items (b); she appears to be silent regarding item (c). To make up for the deficiencies of the alleged admitted prior art the Examiner relies on Willebrand.

Willebrand, however, like the alleged, admitted prior art does not disclose or suggest a RF base station apparatus having a first wireless RF section that is not co-located with processing and control equipment. Rather, Willebrand's transceivers 104, 214, 216 appear to comprise co-located RF and processing/control equipment.

The Examiner appears to be focusing solely on the wireless optical features of the present claims, and overlooking the fact that claims 1-7, 10-13, 16-19, 20-25 and 28-30 also include non co-located RF equipment and processing/control equipment. Though Willebrand discloses the former it does not disclose or suggest the later. All of the processing and control equipment associated with the transceivers 104, 214, 216 is co-located with the RF/optical transceivers.

Perhaps the Examiner is interpreting Willebrand's network management system 102 as being the processing/control equipment of the present invention. If so, the Examiner has not indicated this. Even if this is the Examiner's intent, the system 102 of Willebrand is not a part of an RF base station apparatus as are the RF and non co-located processing/control sections of the present invention.

Accordingly, Appellant respectfully submits that the subject matter of claims 1-7, 10-13, 16-17, 20-25 and 28-30 would not have been obvious to one of ordinary skill in the art upon reading the disclosures of the alleged admitted prior art and Willebrand either separately, or in combination.

Turning to claims 17-19, 22-25 and 28-30, these claims include the feature of: (a) the modulating of a signal representing an RF signal onto an optical signal; (b) transmitting the feature of the optical signal using wireless optical communication equipment to a processing/ control section; wherein (c) the processing/control section is a significant distance from an RF antenna.

In contrast, the alleged admitted prior art discloses an RF base station with its RF antenna and processing/control sections connected by a cable (i.e., the connection is a "wired" connection); not a wireless connection as required by claims 17-19, 22-25 and 28-30 of the present invention. Willebrand does not make up for this deficiency.

In Willebrand, there is no disclosure or suggestion that the antenna section of an optical transceiver 104 is separated, either wirelessly or wired, by a significant distance from its processing/control section, as is required by claims 17-19, 22-25 and 28-30 of the present invention. Instead, Willebrand appears to disclose the connection of multiple optical transceivers 104 in order to provide alternative communication paths.

In sum, neither the alleged admitted prior art nor Willebrand discloses or suggests wireless optical communication equipment that communicates signals between RF wireless communication equipment (e.g., an antenna) and processing/control equipment, where the RF communication equipment and processing/control equipment are separated by a significant distance.

Conclusion:

Appellants respectfully request that the members of the Board reverse the Examiner's rejection of claims 1-7, 10-13, 16-17, 20-25 and 28-30 and allow these claims.

The Commissioner is authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 50-3777 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17; particularly, extension of time fees.

Respectfully submitted,

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VIII. CLAIMS APPENDIX

1. An RF base station apparatus, comprising:

first wireless RF communication equipment; and

wireless optical communication equipment coupled to the first wireless RF communication equipment,

the wireless optical communication equipment being adapted to communicate signals between the first wireless RF communication equipment and processing and control equipment, and

the first wireless RF communication equipment and the processing and control equipment being non-co-located.

2. The apparatus of claim 1, wherein the first wireless RF communication equipment is at a significant distance from the other equipment of the RF base station.

3. The apparatus of claim 2, wherein the significant distance is at least ten meters.

4. The apparatus of claim 1, wherein:

the first wireless RF communication equipment is adapted to receive signals that conform to a predefined wireless communication standard; and

the signals that the wireless optical communication equipment is adapted to communicate represent information that conforms to the predefined wireless communication standard.

5. The apparatus of claim 1, wherein the first wireless RF communication equipment comprises an RF antenna.

6. The apparatus of claim 5, wherein the first wireless RF communication equipment further comprises an RF-module.

7. The apparatus of claim 1, wherein the wireless optical communication equipment comprises a telescope.

8. (Cancelled)

9. (Cancelled)

10. An RF base station, comprising:

an RF antenna;

first wireless optical communication equipment coupled to an RF communication equipment;

a processing and control section, the processing and control section being at a significant distance from the RF antenna;

second wireless optical communication equipment coupled to the processing and control section; and

the first wireless optical communication equipment being adapted to communicate with the second wireless optical communication equipment.

11. The apparatus of claim 10, wherein:

the RF antenna is adapted to receive signals that conform to a predefined wireless communication standard; and

the signals that the wireless optical communication equipment is adapted to communicate represent information that conforms to the predefined wireless communication standard.

12. The RF base station of claim 10, further comprising:

at least one other RF antenna; and

at least a third wireless optical communication equipment, each being adapted to communicate with the second wireless optical communication equipment; one wireless optical communication equipment being coupled to each RF antenna.

13. The RF base station of claim 10, wherein the significant distance is at least ten meters.

14. (Cancelled)

15. (Cancelled)

16. The RF base station of claim 10, wherein:

the first wireless optical communication equipment comprises a first telescope; and

the second wireless optical communication equipment comprises a second telescope.

17. A method, comprising the steps of:

receiving an RF signal at an RF antenna of an RF base station;

modulating a signal representing the RF signal onto an optical signal; and

transmitting the optical signal by wireless optical communication equipment to a processing and control section of the RF base station, the processing and control section being at a significant distance from the RF antenna.

18. The method of claim 17, further comprising the steps of:

receiving the optical signal on second wireless optical communication equipment of the RF base station,

the second wireless optical communication equipment coupled to the processing and control section of the RF base station; and

obtaining the signal representing the RF signal from the optical signal.

19. The method of claim 17, wherein:

signals received by the RF antenna conform to a predefined wireless communication standard; and

the signals transmitted by the wireless optical communication equipment represent information that conforms to the predefined wireless communication standard.

20. (Cancelled)

21. (Cancelled)

22. The method of claim 17, further comprising the step of processing the RF signal to produce a signal that can be modulated onto an optical signal, wherein this step is performed prior to the modulating step.

23. The method of claim 17, wherein the wireless optical communication equipment comprises a telescope.

24. A method, comprising the steps of:

obtaining a signal at a processing and control section of equipment of an RF base station, the processing and control section of equipment being at a significant distance from an RF antenna;

modulating a signal representing the signal onto an optical signal; and

transmitting the optical signal over wireless optical communication equipment to the RF antenna of the RF base station.

25. The method of claim 24, further comprising the steps of:

receiving the optical signal on second wireless optical communication equipment of the RF base station, the second wireless optical communication equipment coupled to the RF antenna; and

obtaining the signal from the optical signal;

obtaining an RF signal from the signal;

transmitting the RF signal on the RF antenna.

26. (Cancelled)

27. (Cancelled)

28. The method of claim 24, wherein the wireless optical communication equipment comprises a telescope.

29. An RF base station, comprising:

an RF antenna; and

a telescope coupled to the RF antenna, the telescope being adapted to communicate signals between the RF antenna and processing and control equipment of the RF base station,

the RF antenna being at a significant distance from the processing and control equipment of the RF base station, and wherein

signals received by the RF antenna conform to a predefined wireless communication standard, and

the signals communicated by the telescope represent information that conforms to the predefined wireless communication standard.

30. The apparatus of claim 29, wherein the significant distance is at least ten meters.

IX. EVIDENCE APPENDIX

None.

X. RELATED PROCEEDINGS APPENDIX

None.